

<p align="center">EMERGENCY SERVICES DIVISION</p> <p align="center">BROOKHAVEN NATIONAL LABORATORY</p>		<p>Procedure No: FR-FPR-5.0.4</p> <p>Revision No: 4</p> <p>Page 1 of 10</p>																				
<p>Title: Inspection and Testing of Fire Protection Valves on Water Based Systems</p>																						
<p align="center"><u>Table of Contents</u></p> <table> <tr> <td><u>Section</u></td> <td><u>Page</u></td> </tr> <tr> <td>1.0 PURPOSE.....</td> <td>2</td> </tr> <tr> <td>2.0 RESPONSIBILITIES.....</td> <td>2</td> </tr> <tr> <td>3.0 DEFINITIONS</td> <td>3</td> </tr> <tr> <td>4.0 PREREQUISITES</td> <td>4</td> </tr> <tr> <td>5.0 PRECAUTIONS.....</td> <td>4</td> </tr> <tr> <td>6.0 PROCEDURE</td> <td>4,5,6,7,8</td> </tr> <tr> <td>7.0 IMPLEMENTATION AND TRAINING.....</td> <td>8</td> </tr> <tr> <td>8.0 REFERENCES</td> <td>8</td> </tr> <tr> <td>9.0 ATTACHMENTS.....</td> <td>8</td> </tr> </table>			<u>Section</u>	<u>Page</u>	1.0 PURPOSE.....	2	2.0 RESPONSIBILITIES.....	2	3.0 DEFINITIONS	3	4.0 PREREQUISITES	4	5.0 PRECAUTIONS.....	4	6.0 PROCEDURE	4,5,6,7,8	7.0 IMPLEMENTATION AND TRAINING.....	8	8.0 REFERENCES	8	9.0 ATTACHMENTS.....	8
<u>Section</u>	<u>Page</u>																					
1.0 PURPOSE.....	2																					
2.0 RESPONSIBILITIES.....	2																					
3.0 DEFINITIONS	3																					
4.0 PREREQUISITES	4																					
5.0 PRECAUTIONS.....	4																					
6.0 PROCEDURE	4,5,6,7,8																					
7.0 IMPLEMENTATION AND TRAINING.....	8																					
8.0 REFERENCES	8																					
9.0 ATTACHMENTS.....	8																					
<p>PREPARED BY: C. LaSalla</p> <p>_____</p> <p>Author/Date</p>	<p>REVIEWED BY: M. Carroll</p> <p>_____</p> <p>Chief/Date</p> <p>J. Vaz</p> <p>_____</p> <p>Division QAO/Date</p>	<p>APPROVED BY: F. Marotta</p> <p>_____</p> <p>Division Manager/Date</p> <p>EFFECTIVE DATE: 08/29/89</p> <p>_____</p> <p>REVIEW CYCLE: 3 years</p>																				
<p>Filing Code: FR20SR.00</p>																						

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title:Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 2 of 10</p>

1.0 **PURPOSE:**

- 1.1 Valves are necessary to permit temporary shutdowns for repairs or alterations to a system, to allow for isolation of defective portions of a system, and to permit shutdown of a system that has operated in order to stop the flow of water, replace operating parts, or recharge the system. The reliable functioning of valves controlling fire protection system is critical to the performance of these systems.
- 1.2 There is no immediate operating difference between a system with valves open and a system with valves closed. Unfortunately, if a closed valve is not discovered and opened before the fire, it often does little good to open the valve after the fire has started. An aggressive inspection and test system is mandatory.
- 1.3 This procedure applies to the inspection and testing of all valves on water based systems which control or affect the proper alarm and suppression performance of fire protection systems.
- 1.4 BNL ES&H Standard 4.2.0, "Impairment of Fire Protection Systems Rev. 1" outlines BNL rules when valves need to be closed. This impairment procedure is an important adjunct to the valve inspection and test program.
- 1.5 There are no known environmental concerns with this operation.

2.0 **RESPONSIBILITIES:**

- 2.1 The Fire Captain who coordinates the valve inspection program, is responsible for assuring that these inspection schedules are maintained and properly recorded. The Coordinating Captain has to periodically update the Fire Chief as to the program status. The Coordinating Captain is responsible for numbering interior valves, Class 1, 2 street valves, post indicating valves, and hydrants. The Coordinating Captain will review any additions, deletions or changes with a Fire Protection Engineer.
 - 2.1.1 The Duty Captain shall ensure that firefighters are properly trained and qualified.
- 2.2 Firefighters are responsible for properly conducting the inspection and tests, and recording the results, and reporting to the Duty Captain any noted problems. The Duty Captain will then initiate any corrective actions which may be required.
- 2.3 The Fire Protection Engineer is responsible for reviewing valve classifications for appropriate assignments.

NOTE: Plant Engineering is responsible for maintenance operation of the water distribution system.

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 3 of 10</p>

3.0 **DEFINITIONS:**

3.1 Fire Protection Valves are valves controlling only the fire protection system or portions thereof. Examples are sprinkler control valves, sectional valves in water systems supplying only hydrants, standpipes or sprinklers.

3.2 Combined Valves are valves controlling both fire and other systems, such as sectional valves in the Laboratory's gridded water mains used both for fire protection and domestic needs. These valves are classed as follows:

3.2.1 Class 1 Valves: Single valves, the closing of which reduces the fire flow below the established minimum requirements for the area (not an individual hydrant), or reduces the available supply to a sprinkler system or other fire protection system to below the minimum requirements. Examples: Shut off valve on a lead-in; one of two valves in a street main supplying a lead from a separate direction in which both must be open to supply fire demand (one is not sufficient for demand).

3.2.2 Class 2 Valves: Single valves, the closing of which reduces reliability (closing a loop, for example).

3.2.3 Class 4 Valves: Valves on separate domestic and process systems, or which only control domestic or process water.

NOTE: The classification of valves is determined by the Fire Protection Engineer.

3.2.4 Service Valves (SV-Series) is an additional description to the class. It describes a lead in valve, not part of the general distribution system.

3.2.5 Post Indicating Valves (PV Series): All Post Indicating Gate Valves (PIGV) and Post Indicating Butterfly Valves (PIBV).

3.2.6 Street Valves (V Series): All water distribution valves not SV Series or PV Series.

3.3 An Inspection is a visual procedure that attempts to determine that a valve is in the correct position.

3.4 A Test is any procedure that verifies that a valve is in adequate operating condition. **NOTE:** The test of valve supervision system, in which the valve is turned one or two turns, only to test the supervisory device, is not a valve test.

3.5 A Locked valve is secured by padlock, chain and padlock, or other padlock system.

3.6 A Sealed valve is secured by a seal identifiable as a Fire/Rescue Group seal, or chaulking.

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 4 of 10</p>

- 3.7 A Supervised valve has a positive position indicator that will transmit a distinctive electrical signal to the Site Fire Alarm System (SFAS) when the valve is operated.
- 3.8 Post Indicating Gate Valve (PIGV) - exterior valve with a gate mechanism for controlling water
- 3.9 Post Indicating Butterfly Valve (PIBV) or Indicating Butterfly Valve (IBV) - exterior or interior valve, with a visual indicator on the gear box controlling a butterfly valve.
- 3.10 O.S. & Y outside screw and yoke valve, found interior but sometimes exterior within a vault.
- 3.11 Ball Valve-1/4 turn valves, usually on small diameter lines, with handles indicating position.
- 3.12 Non-Indicating Gate Valves (NIGV)-a gate valve with no means of indicating valve position system, in which the valve is turned one or two turns, only to test the supervisory device, is not a valve test.

4.0 PREREQUISITES

None

5.0 PRECAUTIONS

- 5.1 Safety during Inspections Tests
- 5.2 In the course of these activities, the firefighter shall be aware of special safety considerations necessary. For example, entry into underground vaults require confined space procedures, work in traffic lanes require hazard flashers, warning lights/international orange vests and/or traffic cones to protect the workers.
- 5.3 Implementation of safety precautions is the Duty Captain's and Lieutenant's responsibility.

6.0 PROCEDURES

Locks and Seals

6.1 Locks

- 6.1.1 All fire protection valves (within the scope of this procedure) are to be provided with locks. Keys for valve locks are safely in the possession of the Fire/Rescue Group.
- Exceptions:
- Curb box valves are impractical to lock.
- Water Motor Gong lines that have independent electrical alarm switches.

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 5 of 10</p>

6.2 Seals

- 6.2.1 All fire protection valves (within the scope of this procedure) are to be sealed.
- 6.2.2 When assured that underground valves are fully open, they are to be sealed using caulking compound around the rim of the valve box cover. The caulking should be placed so that the cover cannot be removed without disturbing the seal.
- 6.2.3 When assured that other valves affecting fire protection service are fully open, they are to be provided with a distinctive Fire/Rescue Group lead button and wire seal. This seal is to be provided on all valves affecting fire protection services even if they are locked and/or supervised. Seals are to be applied so that the badge number is legible.
- 6.2.4 When assured that underground valves are fully open, they are to be sealed using caulking compound around the rim of the valve box cover. The caulking should be placed so that the cover cannot be removed without disturbing the seal.
- 6.2.5 To ensure that seals are not misused, all old seals are to be removed from the area of the valve and disposed of.

6.3 Inspections

- 6.3.1 Frequency
- 6.3.2 Interior Water Based Fire Protection Valves: Based on building inspection schedules (monthly or quarterly).
- 6.3.3 Combined Valves:
 - Class 1: Monthly
 - Class 2: Quarterly
 - Class 3: Yearly
 - Class 4: Not inspected
- 6.3.4 Service Valves: Monthly
- 6.3.5 Post Indicating Valves: Monthly
- 6.3.6 Hydrant Valves: Yearly flow tests as part of “Summer Season Fire Hydrant Inspection” (procedure FR-FPR-5.0.8) are used to confirm the valves condition.

6.4 Inspection Procedures

- 6.4.1 Curb Box Valves:

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 6 of 10</p>

- a) Inspect caulking seal of valve box cover. If there is evidence that the seal has been disturbed, conduct full test described in Paragraph 7.2.
- b) Record results on the work order form carried by the inspector.

6.4.2 All Other Fire Protection Valves:

- a) All interior water based fire protection valves are to be inspected as part of the Building Inspection Program to verify their normal status. If the seal has been broken, conduct full test described in Paragraph 7.3.
- b) Inspect the "Notice Tag" (see Attachment A) to make sure information is complete. This is excluded for exterior valves since the work order serves as this function.
- c) Record each valve inspected on the green "Inspection Tag" (see procedure FR-FPR-5.0.5) attached to or near the valve unless the fire protection valve is being tracked by the bar code system. This is excluded on exterior valves.
- d) Non-indicating valves and Post Indicator Gate Valves (PIGVs) are to be physically tried. This procedure is not required for Post Indicating Butterfly valves (PIBV) and interior IBV's. This is necessary to make sure that the valve is wide open. A valve that is even a few turns short of fully open may curtail water flow.

6.5 Tests

6.5.1 Frequency

6.5.2 Exterior Fire Protection Valves: Yearly**

6.5.3 Combined Valves:

Class 1: Yearly**
Class 2: Yearly**
Class 3: At Installation**
Class 4: Not Tested

** Valves are also tested after impairments.

6.5.4 Curb Box Valve Tests (for V and SV Series affecting Fire Protection:)

- a) Curb box valves are to be tested by fully closing and opening, counting the number

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 7 of 10</p>

of turns in each direction. Both sets of numbers should agree with each other; and with the number recorded on previous inspections. After opening, set it back a quarter turn to prevent jamming.

- b) Valves should open and close with reasonable ease, and there should be no evidence of leaking.

6.5.5 Valve I.D. tags should be in place.

- a) Report any defects to the Duty Captain.
- b) The Duty Captain shall report to Plant Engineering, Maintenance Management.
- c) If the defect requiring repair impairs fire protection performance, an Impairment Report is to be completed. The defect is to be reported to PE Maintenance Management as requiring immediate repair.

6.5.6 Exterior Fire Protection Valves (PV Series):

- a) Valves are to be fully closed and opened. Gate valves are to be set back a quarter turn to prevent jamming. Valve should operate with reasonable ease, and there should be no evidence of leakage. Valve "Notice Tag" should be in place.
- b) Valve operations handles shall not be left on valves unless they are required for locking.
- c) PIGV is wide open if the inspector feels a spring or torsion in the operating rod when he tries to turn it beyond the wide open position (also known as a spring test). Do not rely on the target's reading "OPEN" as mechanical derangement sometimes occurs, and the valve may be closed or partly closed.

6.5.7 Report any defects to the Duty Captain:

- a) The Duty Captain shall report to Plant Engineering Maintenance Management.
- b) If the defect requiring repair impairs fire protection performance, an Impairment Report is to be completed. The defect is to be reported to PE Maintenance Management as requiring immediate repair.

<p align="center">EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY</p>	<p>Procedure No. FR-FPR-5.0.4</p> <p>Revision No. 4</p>
<p>Procedure Title:Inspection and Testing of Fire Protection Valves On Water Based Systems</p>	<p>Page 8 of 10</p>

6.6 Color Codes/Numbering:

6.6.1 The valve covers of underground valves are to be color coded as follows:

Yellow - Water distribution system valves (V series), in service.

White - Water distribution system valves (V series) which are permanently closed and out-of-service.

Red- Service valves (SV series) which only control fire protection services. They have no effect on domestic service.

Yellow - Service valves (SV series) which control both fire protection and domestic & Red services.

Yellow - Service valves (SV series) which control only domestic services. They have & White no effect on fire protection services.

6.6.2 All valves are assigned a unique number as follows:

- a) Water distribution system valves (known as V series), are assigned unique sequential numbers coordinated with the Plant Engineering Division. The Supervisor of Mechanical Design and Construction is the contact point.
- b) Service valves (known as SV series) are assigned unique sequential numbers coordinated with the Plant Engineering Division.
- c) Post-indicator valves (known as PV series) are assigned unique sequential numbers coordinated with the Plant Engineering Division.
- d) Interior valves affecting fire protection (known as FPBV series) are assigned a unique number/letter combination based upon the assignment of interior valve numbers, and is the responsibility of the Fire/Rescue Group.

7.0 IMPLEMENTATION AND TRAINING

None

8.0 REFERENCES

None

9.0 ATTACHMENTS:

Notice Tag

Inspection Tag

EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY	Procedure No. FR-FPR-5.0.4 Revision No. 4
Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems	Page 9 of 10

NOTICE TAG

EMERGENCY SERVICES DIVISION PROCEDURE BROOKHAVEN NATIONAL LABORATORY	Procedure No. FR-FPR-5.0.4 Revision No. 4
Procedure Title: Inspection and Testing of Fire Protection Valves On Water Based Systems	Page 10 of 10

INSPECTION TAG